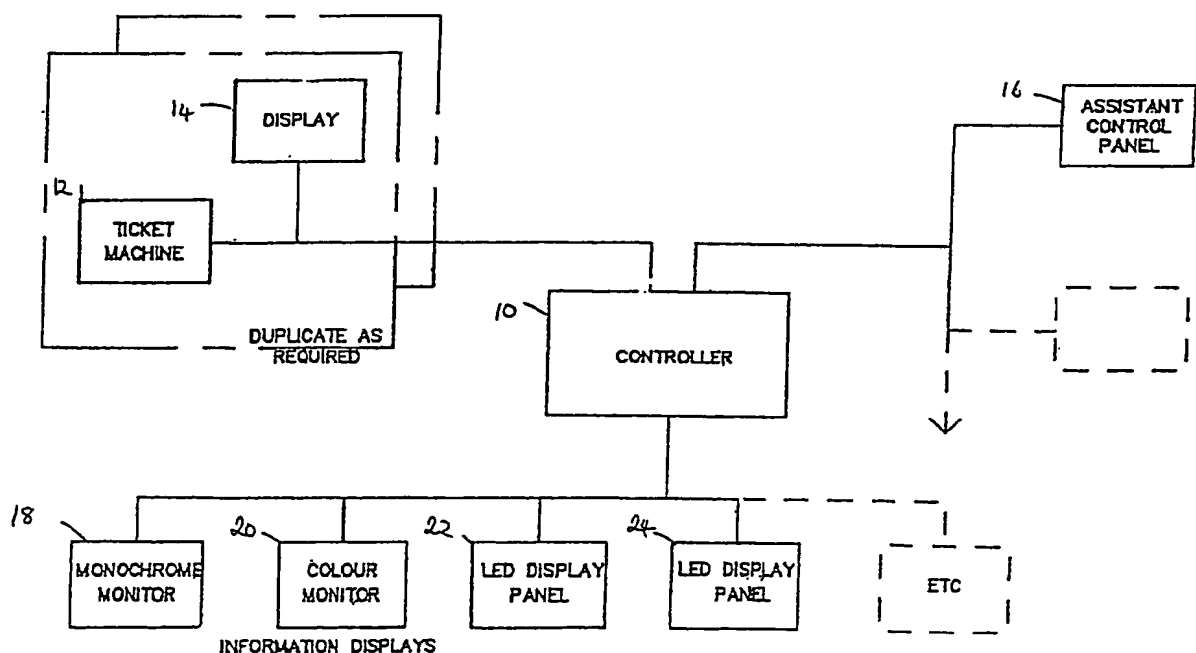(12) **UK Patent Application** (19) **GB** (11) **2 260 010** (13)**A**
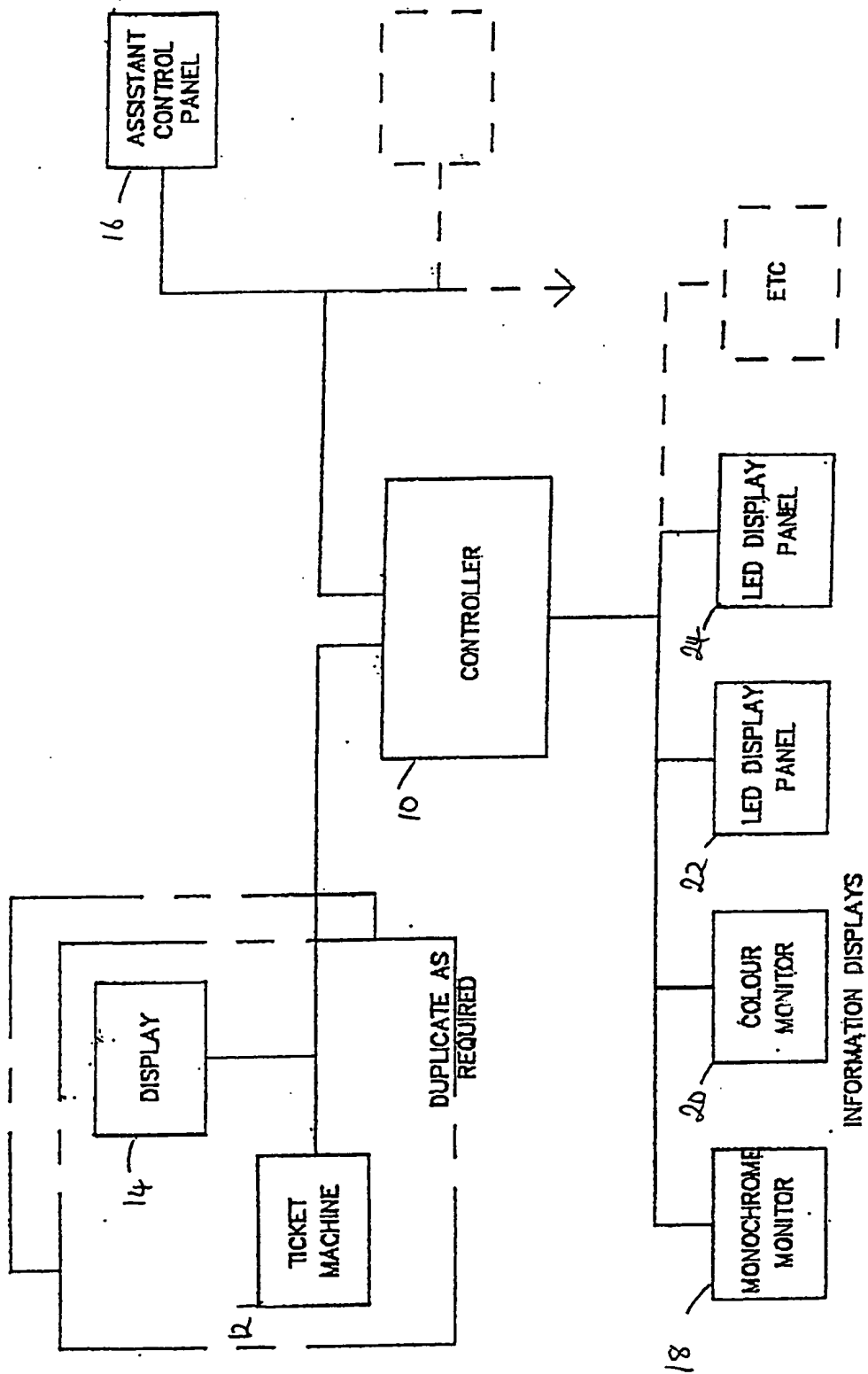
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(71) Applicant
Nadimelia (Overseas) Limited

(Incorporated in Cyprus)

P O Box 1263, Meliza Court, 4th and 7th Floors, 119 Arch Makarios, III Avenue, Limassol, Cyprus

(72) Inventor
Lester Stephen Caine

(74) Agent and/or Address for Service
Reddie & Grose
16 Theobalds Road, London, WC1X 8PL,
United Kingdom

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(54) Queue management system

(57) A queue management system comprises a controller (10) which communicates with one or more ticket dispensers (12, 14), one or more operator stations (16) and one or more displays (18-24). When a customer takes a ticket from the dispenser (12) a signal is sent to and recorded at the controller (10). When a customer is served a signal is sent to the controller (10) from the operator station (16). Serving information is displayed at the display means based on the data received by the controller (10) from the ticket dispenser (12, 14) and the operator station (16). The system may prevent supermarket congestion. The displays (18-24) may display the present and next turn or three ticket numbers to be served and also the approximate waiting time. The operator station (16) may include buttons for pressing by an operator when a customer has been served and/or to indicate that he has gone off duty.

This print incorporates corrections made under Section 117(1) of the Patents Act 1977.

ASSISTANT
CONTROL
PANEL

16

ETC

CONTROLLER

10

DISPLAY

14

TICKET
MACHINE

12

DUPLICATE AS
REQUIRED

LED DISPLAY
PANEL

24

LED DISPLAY
PANEL

22

COLOUR
MONITOR

20

MONOCHROME
MONITOR

18

INFORMATION DISPLAYS

## QUEUE MANAGEMENT SYSTEM

This invention relates to Queue Management Systems and in particular, but not exclusively, to the management of customers waiting to be served in retail outlets.

In the supermarkets and other large retail outlets it is common practice for some departments to operate a queue management system. In the least sophisticated versions departments such as a delicatessen will mount a ticket dispenser on the serving counter. Customers will take a numbered ticket and will be served in order. Often a display is available to show customers which ticket numbers are being served at a given time. The displays are controlled by the serving assistants who increment the display after they have finished serving a customer.

Queue management systems are particularly useful in supermarkets as they allow shoppers to reserve a place in a queue to be served and then to carry on shopping in other parts of the store. This suits both the shopper, as it reduces shopping time, and the store as it reduces congestion around busy departments such as delicatessens.

Some more advanced queue management systems incorporate a number of displays arranged around the store which are linked to display the same number at a given time. As a further development systems have been implemented in which two separate ticket dispensers produce tickets in order, irrespective of the order in which the dispensers are used. This system requires a system controller which can log the removal of a ticket from either dispenser and increment the next ticket number dispensed from either machine.

Despite the improvements in queue management systems outlined above, the advent of larger stores with larger counter areas and a greater number of assistants serving has resulted in the

existing systems being inadequate. As a result supermarket congestion has increased and there is a strongly felt need in the industry for a queue management system which can improve customer flow and cope with the advances in supermarket store layout.

The present invention aims to meet the need referred to and to provide a method and apparatus for queue management which overcomes the shortcoming of existing systems and is suitable for modern large supermarkets and similar outlets. The system is not only suitable to retail shops such as supermarkets and department stores but may be applied to any situation where queue management is necessary, for example sports grounds, exhibitions, museums and the like.

In essence the invention overcomes the limitations of the prior art by adopting the principle of central control. In this manner any number of assistant inputs display outputs and ticket dispensers can be controlled.

More specifically, the invention is defined by the independent claims to which reference should now be made.

A system and method embodying the invention has many advantages over the prior art. The system is very flexible and can provide any desired information to customers. Moreover, the method and system achieved queue management by avoiding the necessity for customers to crowd around a counter to avoid missing a service turn.

Further advantages accrue from the features of the dependent claims and other features of the preferred embodiment to be described.

An embodiment of the invention will now be described with reference to the accompanying drawing which is a schematic block diagram of a queue managment system embodying the invention.

The basic elements of the queue management system are the system controller 10, a ticket dispensing machine 12 with an optional display 14, an assistant or operator control panel 16 and at least one display. In the figure four separate displays 18, 20, 22, 24 are shown by way of example. Further displays may be added as desired.

All the elements of the system are linked to the controller 10. In the case of the assistant control panel 16 and the information displays 18-24 the communication is one way; from the assistant control panel to the controller, and from the controller to the information displays respectively.

The displays 18-24 are located at strategic intervals around the store. A main display would be located at the counter to which the queue management systems relate and the remainder located at intervals around the store. One screen could, for example, be situated in a store controllers or managers office so that the queue control can be observed.

The ticket machine may be located at the counter itself in the simplest embodiment. In more sophisticated versions a number of ticket dispensers are arranged around the store. A monitor 14 with each ticket machine gives the user instructions such as "PLEASE TAKE A TICKET". In addition, the display may give an indication of the waiting time the customer may expect. For example the display may also show: "WAITING TIME XX MINUTES".

The simplest system operates in the following manner. The first customers will take a ticket from the dispensers 12 and will be served by the assistants. The ticket number is supplied to the dispenser from the controller and, when taken by a customer, a 'TICKET TAKEN' signal is sent back to the controller, upon receipt of which the controller increments a ticket number register.

When an assistant is ready to serve a customer he or she presses a button on the assistant control panel 16 which sends a 'SERVING' signal to the controller. On receipt of the serving signal the controller sends a 'NOW SERVING' signal to the display 14 (if present) and the information displays 18 to 24. On receipt of the first 'SERVING' signal the 'NOW SERVING' signal will cause the displays to display the legend 'TICKET NO 1 NOW BEING SERVED' or some similar legend. Each additional 'SERVING' signals causes the controller to send a signal updating the displayed legend by a digit.

In addition to the basic serving information the controller can be used to generate and display further information such as approximate waiting time. The controller can calculate the approximate waiting time on the basis of the difference between the current ticket number and the number being served together with the average time between successive 'SERVING' signals being received at the controller.

As a variant to displaying merely the present number being served the controller can display both the present number and the next two or three numbers, for example a typical display might read:

```
NOW SERVING

XX

Please Join Queue

AA BB
```

In the manner the problem of customers missing their turn is alleviated as their number is displayed for a greater time.

It is envisaged that in most implementations a number of assistants will be serving. Thus, there will be a number of assistant control panels 16a, 16b etc.. These are arranged as shown in the figure such that operator keyed information is transmitted on a single bus to the channel irrespective of which operator/assistant has sent the information. It is not necessary to identify which operator sends, eg a 'SERVING' signal, merely that it has been sent.

With a number of operators, a suitable display format would be:

```
NOW SERVING

XX YY ZZ AA

Please queue

BB CC DD EE
```

In this manner congestion around the counter can be reduced and the queue reduced to one person queuing for each customer being served.

Heretofore, the operator control panel has been described as having a single button which indicates that a customer is or has been served. In fact, the panel may be more complex. One button or switch is provided to indicate that the operator is off duty. This will send an appropriate signal to the controller which will then know that one less operator is working at the counter and will revise estimated queuing times and other information accordingly.

Further buttons are provided together with a small display showing the next customer in the queue. For this the communication with the controller must be two-way.

When the assistant finishes with a customer he/she either presses the off-duty button or selects the next customer. If the next customer eg. BB does not show up a further next customer button can be pressed to serve CC. Customer BB remains in the queue but after eg. three successive failures to turn up customer BB will be eliminated from the queue.

If there are no customers waiting to be served, receipt of a 'SERVING' signal at the controller will cause a message to be displayed on the information displays, for example:

'NO QUEUE AT DELICATESSEN'

With the controller arranged to control a number of operator panels, a number of ticket dispensers each having a display, and a number of displays located around the store, the system may operate as follows:

1. If there is no queue the displays 14 at the individual ticket dispensers may be changed to the following:

'WE ARE WAITING TO SERVE YOU
 PLEASE STEP UP TO THE COUNTER'

As soon as there are no free assistants the display will switch back to instructing customers to take a ticket and giving the appropriate waiting time.

2. The queuing list will only show the active tickets and as a customer takes a ticket the number will appear in the queue.

3.     Waiting time may be calculated in the manner outlined previously.  This time may be used to calculate the time at which further tickets should be dispensed before closing time.   For example, if the queue length is ½ hr,  30 minutes before the store closes the controller will not react to  'SERVING' signals generated by the operator controls.   At such a time the controller can change the display to indicate that the delicatessen is closing.

Many variations to the system described are possible and will occur to the person skilled in the art.  Indeed, an advantage of the system is its flexibility which allows adaptation to the requirements of the stone in which it is to be installed.

In one modification a keyboard can be used to input information to the controller to display, in addition to the queue management information store information such as special promotions or offers. Queue management monitors may be located at each checkout point which would in addition indicate the status of that checkout, eg. cash only or credit card accepted. As a further development the system may be used in conjunction with the applicants graphic wall display system as described in co-pending application PCT/GB90/01729.   In this application graphics information is spread over a number of monitors.   Such a combination would allow simultaneous display of queuing information, special offers advertisements etc.   Whilst maintaining a display easily readable by the customer.

## CLAIMS

1.   A queue management system for managing the serving of customers at a serving station comprising:

a system controller;

a ticket dispenser for dispensing tickets carrying serving information, the dispenser being in communication with the controller;

an operator station to be arranged at the serving station and in communication with the controller; and

a display means communicating with the controller for displaying information relating to the serving of customers holding dispensed tickets, the information displayed being dependent on data communicated to the controller by the ticket dispenser and the operator station.

2.   A system according to Claim 1, wherein the tickets dispensed by the dispenser each carry an individual customer identifier, and wherein the display means comprises:

a first display means for indicating the customer identifier being served at the sevice station; and

a second display means proximate the ticket dispenser for displaying additional information based on data communicated to the controller from the ticket dispenser and the operator station.

3.   A system according to Claim 2, wherein the first display means comprises a plurality of displays arranged at different locations.

4.   A system according to Claim 2 or 3, comprises a plurality of ticket dispensers each in communication with the controller, whereby the controller controls the identifiers applied to

tickets issued by each dispenser so that tickets are issued with an identifier dependent upon the previous ticket issued by dispenser issuing the present ticket.

5. A system according to Claim 4, wherein each ticket dispenser has an associated second display means.

6. A system according to any preceding claim, wherein the operator station comprises means for communicating to the controller and indication that the operator is free to serve a further customer and means for indicating to the controller that the operator is no longer available to serve customers.

7. A system according to Claim 6, comprising a plurality of further operator stations.

8. A system according to Claim 7 appendent Claim 5, wherein the first display means displays the ticket identifier at present being served and the next n ticket identifiers to be served in order of issue of ticket where n is the number of operator stations; and wherein the second display means indicates the estimated time until serving based on information received by the controller from the operator stations and the ticket dispensers.

9. A system according to Claim 8, wherein the operator stations each comprises means for indicating to the controller that a ticket holder has not arrived to be for served, and the controller comprises means for instructing the display means to display the next ticket identifier as being ready for serving whilst retaining the unserved identifier temporarily in the queue waiting to be served.

10. A queue management system, substantially as herein described with reference to the accompanying drawings.

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| Category | Identity of document and relevant passages | Relevant to claim(s, |
|----------|-------------------------------------------|----------------------|
|          |                                           |                      |

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